JAPAN

EDICT OF GOVERNMENT

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JIS K 6775 (1989) (English): Polyethylene pipe-fittings for the supply of gaseous fuels

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The citizens of a nation must honor the laws of the land.

Fukuzawa Yukichi

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JAPANESE INDUSTRIAL STANDARD

Polyethylene Pipe-fittings for the Supply of Gaseous Fuels

JIS K 6775—1989

Translated and Published

by

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Printed in Japan

In the event of any doubt arising,
the original Standard in Japanese is to be final authority.

UDC 621.643.4:678-462:678.742.2:665.72:662.76

JAPANESE INDUSTRIAL STANDARD J I S

Polyethylene Pipe-fittings for the Supply of Gaseous Fuels

K 6775-1989

1. Scope

This Japanese Industrial Standard specifies the fittings used for fusion bonding, hereinafter referred to as the "fittings", of the polyethylene pipes, hereinafter referred to as the "pipes", specified in JIS K 6774.

Remarks 1. For the use of the fittings, direct ray of the sun and fine shall be taken into consideration.

Further, sufficient considerations shall be taken concerning fusion bonding condition, fusion bonding compatibility of fittings, etc.

Furthermore, where fusion bonding compatibility is necessarily evaluated, a fusion junction performance test specified in Appendix may be designated concerning evaluation of the performance of the fusion bonding part subject to the agreement between the parties concerned with delivery.

2. The units and numerical values given in { } in this Standard are in accordance with the conventional system of units, and are Standard values.

2. Classification

The fittings shall be classified by the melt flow rate of material used, the junction shape of fittings, and the molding method of the fittings as given in Tables 1 to 3.

Table 1. Classification by Melt Flow Rate of Material of Fittings

Class	Melt flow rate
Class A	0.15 and over to 0.4 excl.
Class B	0.4 and over to 1.0 excl.
Class C	1.0 and over to 2.5 excl.

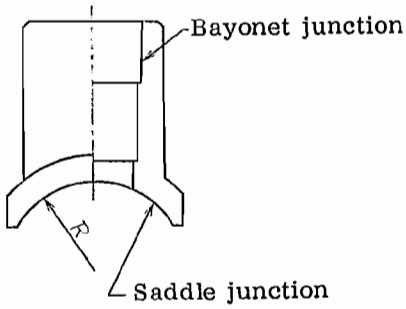
Applicable Standards and Corresponding International Standards:
See page 49.

Table 2. Classification by Junction Shape of Fittings

Class	Junction shape	Junction method	Class of pipe to be joined
Bayonet junction fittings	A junction shape having a tapered inner peripheral surface.	After fusing the junction of the fitting and the end outer surface of a pipe by heating, join the fitting and the pipe by insertion.	No. 1
Heating-wire containing-bayonet junction fittings	A junction shape having a cylindrical inner peripheral surface, heating elements such as heating wire or the like are integrated preliminarily into the junction.	After inserting a pipe into a fitting, fuse the junction and an end outer surface of the pipe by heating with a heating element incorporated in the junction of the fitting to be joined.	No. 1
Spigot type bayonet junction fittings	A junction shape of which the junction end has the same outside diameter as that of a pipe, and this bayonet junction fitting is combined with a heating-wire-containing junction fitting to be used.	After inserting a fitting into a heating-wire-containing bayonet junction fitting, fuse the junction and an end outer surface of the fitting by heating with a heating element incorporated into the junction of the heating-wire-containing bayonet junction fitting to be joined.	No. 1
Butt junction fittings	A junction shape of which a fitting end part has the same outside diameter and thickness as those of a pipe.	After fusing the junction of a fitting and the end part of the pipe by heating, join them by pressure fixing.	No. 1, No. 1U, No. 2, and No. 3
Saddle junction fittings	A junction shape having a saddle-backed junction sarface having the same curvature as an outside diameter basic size of a pipe.	After fusing the junction of a fitting and an outer surface of the tube by heating, join by pressure fixing.	No. 1
Heating-wire containing-saddle junction fittings	A junction shape having a saddle-backed junction surface having the same curvature as an outside diameter basic size of a pipe, and heating elements such as heating wire or the like are preliminarily incorporated into the junction.	After pressurizing a junction of a pipe and an outer surface of a pipe, fuse the junction and the outer surface of the pipe by heating with a heating element incorporated into the junction of the fitting to be joined.	No. 1

Remark: A fitting can be assembled by combining not less than two kinds of junctions.

(1) An example of a fitting assembled by combining bayonet junction and saddle junction



(2) An example of a fitting assembled by combining spigot type bayonet junction and saddle junction containing heating wire.

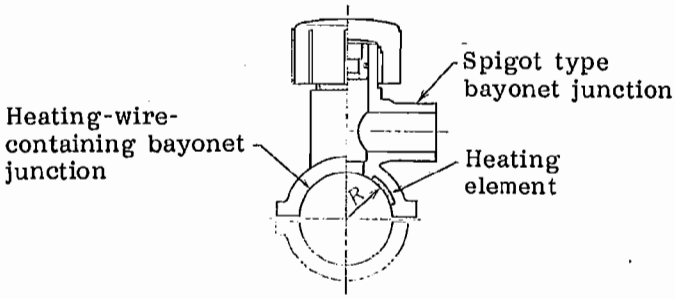


Table 3. Classification by Molding Method of Junction Fittings

Class	Molding method of butt junction fitting
KŌ (Japanese) type	A junction fitting manufactured by unified molding with an injection molder or the like.
OTSU (Japanese) type	A junction fitting of which the body is molded in a body with an injection molder or the like and of which a butt junction is a pipe bonded by fusion.

3. Quality

3.1 Performance The performance of fittings shall be subjected to the test of 6. and the results shall conform to the requirements specified in Tables 4. and 5.

Table 4. Short Term Performance of Fittings

Test item	Performance	Applicable clause
Ring tensile test	Tensile yield strength 14.7MPa{150kgf/cm²}min.	6.8
Burst hydraulic test	No. 1 Maximum pressure 3.43MPa{35kgf/cm²}min. No. 1U Maximum pressure 2.75MPa{28kgf/cm²}min. No. 2 Maximum pressure 2.16MPa{22kgf/cm²}min. No. 3 Maximum pressure 1.67MPa{17kgf/cm²}min.	6.9
Elongation test at elevated temperature	Variation rate in outside diameter and length ±5% Variation in angle ±5°	6.10
Hot internal pressure creep test	Not to show cracks and other defects.	6.11
Compression peeling test (1)	Peeling length rate of fusion junction is 15% max., and other defect shall not be generated.	6.12

Note (1) The compression peeling test applies only to a fitting into which heating elements such as heating wire are incorporated.

Table 5. Long Term Performance of Fittings

Test item	Performance	Applicable clause
Long term hot internal pressure creep test	Not to show cracks and other fefects.	6.16

3.2 Appearance and Shape The appearance and shape of fittings shall be as follows:

(1) Inside and outside surfaces of fittings shall be smooth, and, free from flaws, cracks, distorsion and other defects which are inpedimental to use.

(2) Section of the fitting shall be practically true circle, and both end faces thereof shall be at right angles with the axis of the fitting.

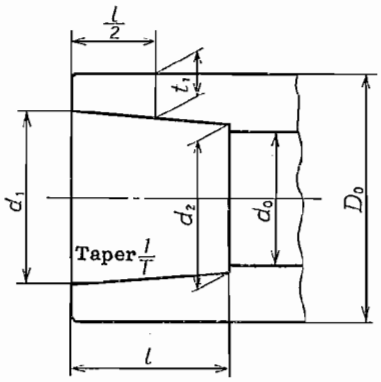
3.3 Color of Fittings The color of fittings shall be green. However, colors other than green may be taken subject to the agreement between the parties concerned with delivery.

4. Dimensions of Junction

4.1 Dimensions of Junction of Bayonet Junction Fittings Dimensions of the junction of a bayonet junction fitting and permissible deviations thereon shall be as given in Table 6.

Further, d_2 and D_0 given in Table 6. are appended for informative reference and are not a part of this Standard.

Table 6. Dimensions of Junction of Bayonet Junction Fittings and Permissible Deviations Thereon



Unit: mm

Symbol / Designation	d_0(2)	d_1	Permissible deviation on d_1 (3)	t_1	permissible deviation on t_1 (4)	l	permissible deviation on l	$\frac{1}{T}$	Informative reference d_2	Informative reference D_0
20	20	26.10	±0.20	5.4	−0.15	22	±2	$\frac{1}{57}$	25.7	37
25	26	33.00		6.2	−0.20	24			32.6	46
30	33	41.00	±0.25	7.1	−0.20	25			40.6	56
40	38	46.90		8.0	−0.25	28			46.4	63
50	48	58.80	±0.30	9.9	−0.30	30			58.3	79
75	71	87.60	±0.35	14.6	−0.45	36			87.0	118
100	91	112.50		18.8	−0.55	41			111.8	152

Notes (2) d_0 is the minimum value and its maximum value shall not exceed d_2.

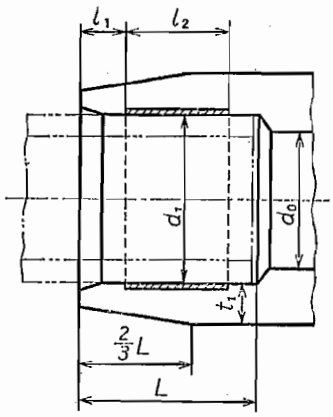
(3) Permissible deviation on dimension d_1 means a difference between dimension d_1 measured by 6.2 and dimension d_1 given in Table 6.

(4) A plus side of permissible diviations on dimension t_1 is not limited.

4.2 Dimension of Junction of Heating-Wire-Containing Bayonet Junction Fittings Dimensions of the junction of a heating wire containing bayonet junction fitting and permissible deviations thereon shall be as given in Table 7.

Further, L and d_0 given in Table 7. are appended for informative reference and are not a part of this Standard.

Table 7. Dimensions of Junction of Heating-Wire-Containing Bayonet Junction Fittings and Permissible Deviations Thereon



Unit: mm

Symbol / Designation	d_1	Permissible deviations on d_1 (5)	l_1(6)	l_2(6)(7)	t_1(6)(8)	Informative reference	
						L	d_0
20	27.35	±0.15	5	18	4.0	33	20
25	34.40	±0.20		20	4.5	35	26
30	42.40	±0.20		23	5.1	38	33
40	48.40	±0.20		24	5.8	41	38
50	60.50	±0.20		28	7.1	46	48
75	89.70	±0.20		37	10.3	58	71
100	114.85	±0.25		44	13.1	71	91
150	166.10	±0.30		50	18.8	78	132
200	217.45	±0.35		75	24.5	103	172

Notes (5) Tolerance on dimension d_1 applies to a range where heating elements such as heating wire are incrorporated.

(6) l_1, l_2 and t_1 are the minimum values.

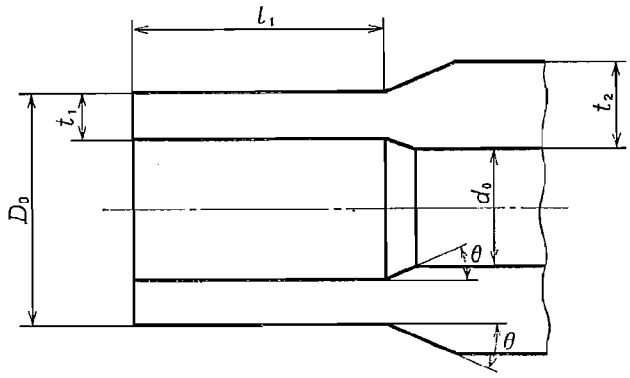
(7) Dimension l_2 is the dimension of a range where heating elements such as heating wire are incorporated.

(8) Dimension t_1 applies to all range excluding the range of $\frac{2}{3}L$ from a junction end part.

4.3 Dimensions of Junction of Spigot Type Bayonet Junction Fittings
Dimensions of the junction of a spigot type bayonet junction fitting and permissible deviations thereon shall be as given in Table 8.

Further, d_0, t_2 and θ given in Table 8 are appended for informative reference, and are not a part of this Standard.

Table 8. Dimensions of Junction of Spigot Type Bayonet Junction Fittings and Permissible Deviations Thereon



Unit: mm

Desig nation	D_0	Permissible deviations on D_0 (9)(10)	t_1(10)(11)	l_1(11)	Informative reference		
					d_0	t_2	θ (°)
20	27.0	±0.15	3.0	33	19	5.4	30 max.
25	34.0		3.4	35	25	6.2	
30	42.0		3.9	38	31	7.1	
40	48.0		4.4	41	36	8.0	
50	60.0	±0.20	5.5	46	45	9.9	
75	89.0	±0.30	8.1	58	68	14.6	

Notes (9) Permissible deviation on dimension D_0 means a difference between dimension D_0 measured according to 6.2 and dimension D_0 given in Table.

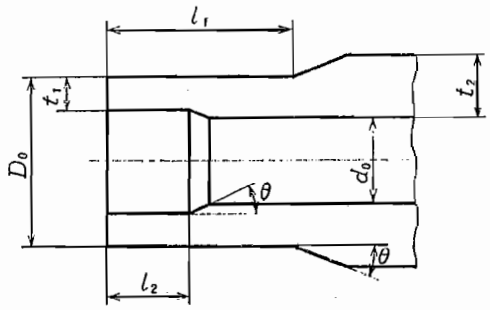
(10) Permissible deviation on dimension D_0 and dimension t_1 apply to the range within l_1 from an end face of a fitting body.

(11) t_1 and l_1 are the minimum values.

4.4 Dimensions of Junction of Butt Junction Fittings Dimensions of the junction of a butt junction fitting and permissible deviations thereon shall be as given in Table 9 and Table 10.

Further, t_2 and θ given in Table 9 and Table 10 are appended for informative reference, and are not a part of this Standard.

Table 9. Dimensions of Junction of KŌ (Japanese) Type Butt Junction Fittings and Permissible Deviations Thereon



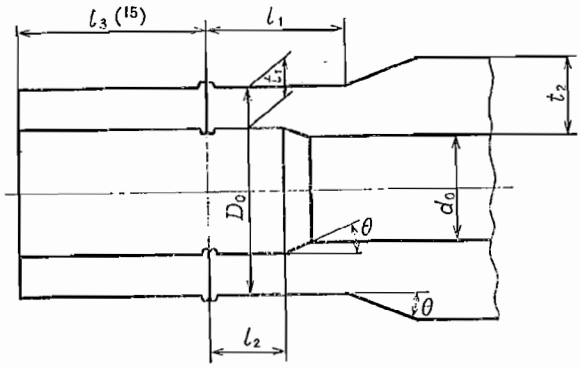
Unit: mm

Class of pipe to be joined	Designation	D_0	Permissible deviations ([12]) on D_0 (°)	t_1	Permissible deviations on t_1 ([12])	d_0([13])	l_1([11])	l_2([13])	Informative reference	
									t_2	θ(°)
No. 1	50	60.0	±0.20	5.5	$+0.8_{0}$	46	85	25	9.9	30 max.
	75	89.0	±0.30	8.1	$+1.1_{0}$	68		28	14.6	
	100	114.0	±0.35	10.4	$+1.3_{0}$	87		33	18.8	
	150	165.0	±0.50	15.0	$+1.7_{0}$	127		43	27.0	
	200	216.0	±0.65	19.7	$+2.2_{0}$	166		54	35.5	
No. 1U	100U	114.0	±0.35	8.5	$+1.1_{0}$	87		33	18.8	
	150U	165.0	±0.50	12.3	$+1.5_{0}$	127		43	27.0	
	200U	216.0	±0.65	16.0	$+1.8_{0}$	166		54	35.5	
No. 2	100	114.0	±0.35	6.8	$+0.9_{0}$	87		33	18.8	
	125	140.0	±0.45	8.3	$+1.1_{0}$	108		35	23.0	
	150	165.0	±0.50	9.8	$+1.2_{0}$	127		43	27.0	
	200	216.0	±0.65	12.8	$+1.5_{0}$	166		54	35.5	
No. 3	150	165.0	±0.50	7.9	$+1.0_{0}$	127		43	27.0	
	200	216.0	±0.65	10.3	$+1.3_{0}$	166		54	35.5	

Notes ([12]) Dimensional permissible deviations on D_0 and t_1 apply within 25 mm from an end face.

([13]) d_0 and l_2 are the minimum values.

Table 10. Dimensions of Junction of OTSU (Japanese) Type Butt Junction Fittings and Permissible Deviations Thereon



Unit: mm

Class of pipe to be joined	Desig nation	D_0	Permissible deviation ([14]) on D_0 (°)	t_1	Permissible deviation on t_1 ([14])	d_0([13])	l_1([11])	l_2([13])	Informative reference	
									t_2	θ(°)
No. 1	150	165.0	±0.50	15.0	$+1.7$ 0	127	15	10	27.0	30 max.
	200	216.0	±0.65	19.7	$+2.2$ 0	166			35.5	
No. 1U	150U	165.0	±0.50	12.3	$+1.5$ 0	127			27.0	
	200U	216.0	±0.65	16.0	$+1.8$ 0	166			35.5	
No. 2	150	165.0	±0.50	9.8	$+1.2$ 0	127			27.0	
	200	216.0	±0.65	12.8	$+1.5$ 0	166			35.5	
No. 3	150	165.0	±0.50	7.9	$+1.0$ 0	127			27.0	
	200	216.0	±0.65	10.3	$+1.3$ 0	166			35.5	

Notes ([14]) Dimensional permissible deviations on D_0 and t_1 apply within 10 mm from an end face of a junction body. However, butt junction parts are excepted.

([15]) For l_3, pipes of No. 1 to 3 specified in JIS K 6774 are used. The length may be optionally determined subject to the agreement between the parties concerned with delivery.

5. Materials and Manufacturing Method

5.1 Materials of a fitting shall be copolymer of polyethylene or ethylene as main component for principal raw materials. They shall be subjected the test of 6, and the results shall conform to the requirements specified in Tables 11 and 12.

Table 11. Short Term Performance of Materials

Test item	Performance	Applicable clause
Melt flow rate test	Class A 0.15 and over to 0.4 excl. Class B 0.4 and over to 1.0 excl. Class C 1.0 and over to 2.5 excl.	6.4
Density test	0.933 g/cm^3 and over up to 0.939 g/cm^3 excl.	6.5
Tensile test	Tensile yield strength 17.7MPa{180kgf/cm^2}min.	6.6
	Tensile elongation at break 300 % min.	
Charpy impact test	9.8kJ/m^2 {10kgf·cm/cm^2}min.	6.7

Table 12. Long Term Performance of Materials

Test item	Performance	Applicable clause
Environmental stress cracking test for material	Period required for generation of 50 % crackings 240 h min.	6.13
Immersion test	Percent variation of tensile yield strength ± 12 %	6.14
	Mass variation when immersed in fluid paraffin, mixture of tential butyl mercaptan and fluid paraffin, methanol, isopropanol and ethylene glycol ± 1 mg/cm^2	
	Mass variation when immersed in mixture of benzene and methanol ± 2 mg/cm^2	
Weathering test	Percentage reduction of elongation 20 % max.	6.15

5.2 Coloring agent and stabilizing agent used in manufacture of fittings shall be of excellent quality, and they shall be evenly dispersed in the material.

5.3 Fittings shall be manufactured with an injection molding press or the like.

6. Test Methods

6.1 Test Piece The preparation method and conditioning of a test piece shall be made as described below:

(1) A specimen fitting and a specimen material, hereinafter, referred to as a sample, shall be respectively sampled by a reasonable process from a lot of fittings and a lot of materials of which the quality is considered the same one.

(2) For a specimen plate, the sample is formed in a plate shape by a method specified in 3.(1) of JIS K 6760. A thickness of the specimen plate shall be 2 ± 0.2 mm. However, a thickness of the specimen plate for Charpy impact test shall be 4 ± 0.2 mm.

(3) The preparation method and conditioning of the test pieces used for the test of fittings and the test of materials shall be made as specified in Tables 13 and 14. Granular samples shall be used for the melt flow rate test of the materials.

The test pieces to be used for the melt flow rate test and density test of the materials shall contain no coloring agent.

Table 13. Test Pieces for Short Term Performance Tests

Test item	Test pieces					Applicable test	
	Shape	Preparation method	Number of pieces	Conditioning		Test of fitting	Test of material
				Temperature °C	Time h		
Melt flow rate test	Granular	Use approximately about 4 g of granular sample.	3	-	-	-	○
Density test	Plate form	Cut out to a piece of 1 to 5 g capable of being measured from a specimen plate.		23 ± 2		-	○
Tensile test	Fig. 1	Cut out to the shape shown in Fig. 1 from a specimen plate.				-	○
Charpy impact test	Fig. 2	Cut out to the shape shown in Fig. 2 from a specimen plate.	7			-	○
Ring tensile test	Fig. 3	Cut out to the shape shown in Fig. 3 from a specimen fitting. However, cut out from the fitting body for OTSU (Japanese) type. Further, scrape off the heating-wire part on an inner face for a heating-wire-containing bayonet junction fitting.				○	-

Table 13 (Continued)

Test item	Test pieces					Applicable test	
	Shape	Preparation method	Number of pieces	Conditioning		Test of fitting	Test of material
				Temperature °C	Time h		
Burst hydraulic test	Fitting	Join a length of not less than 500 mm of a pipe to be applied to a fitting body for butt junction fittings and a length of not less than 500 mm of No. 1 pipe for bayonet junction fittings, heating-wire-containing bayonet junction fittings, and spigot type bayonet junction fittings by fusion to a specimen fitting. Further, for saddle junction fittings and heating-wire-containing saddle junction fittings, join the specimen fitting to a central part of a length of not less than 1000 mm of No. 1 pipe.		$23\ ^{+5}_{-2}$		○	-
Elongation test at elevated temperature		Specimen fitting		23 ± 2		○	-

Table 13 (Continued)

Test item	Test pieces					Applicale test	
	Shape	Preparation method	Number of pieces	Conditioning		Test of fitting	Test of material
				Temperature °C	Time h		
Hot internal pressure creep test	Fitting	Join a length of not less than 250 mm for 100 max. in designation, and a length of not less than 375 mm for 150 min. in designation of a pipe to be applied to a fitting body for butt junction fittings, and of No. 1 pipe for bayonet junction fittings, heating-wire-containing bayonet junction fittings, and spigot type bayonet junction fittings by fusion to a specimen fitting. Further, join a lengith of not less than 500 mm for 100 max. in designation and a length of not less than 750 mm for 150 min. in designation of No. 1 pipe by fusion to a central part of the pipe for saddle junction fittings and heating-wire-containing saddle junction fittings.	3	80 ± 1	1 min. However, a test piece to be joined by fusion shall be left at ordinary temperature for not less than 24 h after fusion bonding.	○	-
Compression peel test	Fig. 4	Join a specimen fitting and No. 1 pipe by fusion, and cut out to the shape giuven in Fig. 4.		23 ± 2		○	-

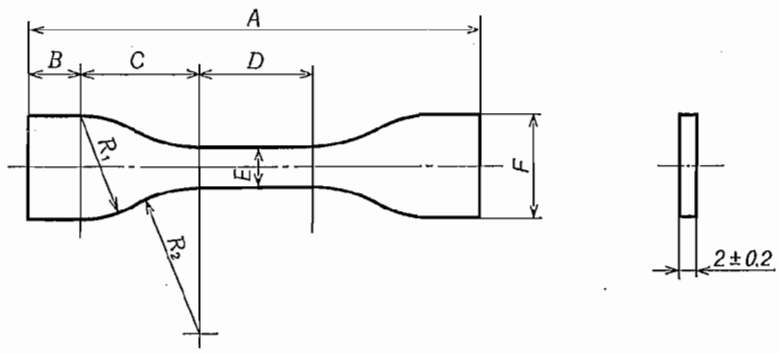
Remark: For heating-wire-containing bayonet junction fittings and heating-wire-containing saddle junction fittings, fusion junction shall be performed by fusion bonding conditions specified by the menufacturer.

Table 14. Test Pieces for Long Term Performance Tests

Test item	Test pieces					Applicable test	
	Shape	Preparation method	Number of pieces	Conditioning		Test of fitting	Test of material
				Temperature °C	Time h		
Environmental stress cracking test for material	Fig. 5	Cut out to the shape shown in Fig. 5 from a specimen plate.	30	23 ± 2	1 min. However, a test piece to be joined by fusion shall be left at ordinary temperature for not less than 24 h after fusion bonding.	-	○
Immersion test	Plate form	cut out to a size of 100 mm x 25 mm or larger from a specimen plate.	3			-	○
Weathering test	Fig. 1	Cut out to the shape shown in Fig. 1 form a specimen plate.	5			-	○
Long term hot internal pressure creep test	Fitting	Join a length of not less than 250 mm for 100 max. in designation and a length of not less than 375 mm for 150 min. in designation of a pipe to be applied to a fitting body for butt junction fittings and of No. 1 pipe for bayonet junction fittings, heating-wire-containing bayonet junction fittings, and spigot type bayonet junction fittings by fusion to a specimen fitting. Further, join a length of not less than 500 mm for 100 max. in designation and a length of not less than 750 mm for 150 min. in designation of No. 1 pipe by fusion to a central part of the pipe for saddle junction fittings and heating-wire-containing saddle junction fittings.	3	80 ± 1		○	-

Fig. 1. Tensile Test Piece

Unit: mm



Unit: mm

Type	A	B	C	D	E	F	R_1	R_2
Plate form	100	15	25	20	5.0	25	25	11

Fig. 2. Charpy Impact Test Piece

Unit: mm

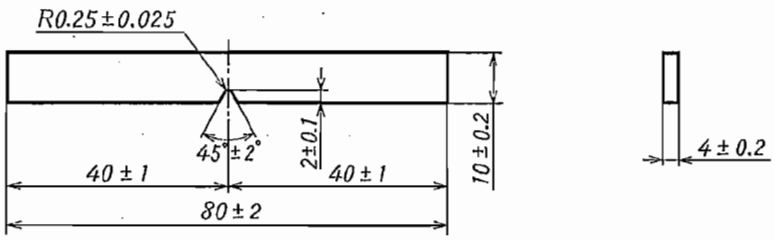


Fig. 3. Ring Tensile Test Piece

Unit: mm

(For heating-wire-containing bayonet junction fittings)

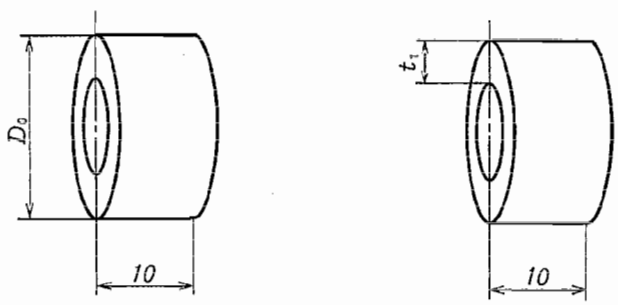


Fig. 4. Compression Peel Test Piece

Unit: mm

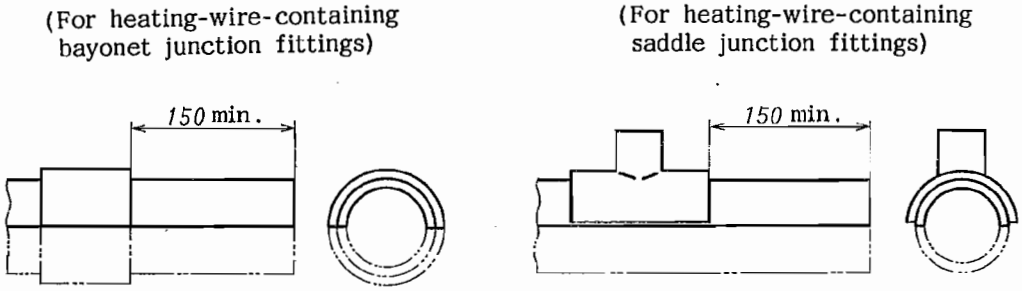
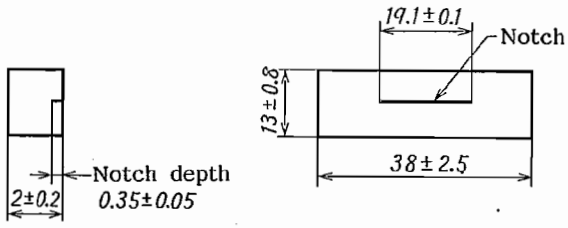


Fig. 5. Environmental Stress Cracking Test Piece for Material

Unit: mm



6.2 Dimensions The dimensions shall be measured at 23 ± 2°C by using the micrometer specified in JIS B 7502, the vernier callipers specified in JIS B 7507, etc.

The dimensions of an inside diameter and an outside diameter shall be a mean value of measured values in four directions equidistant (45°) to each other.

Further, for the dimension of the outside diameter, a quotient of the measured circumference value by the number π 3.142 may be used.

6.3 Appearance and Shape The appearance and shape shall be examined by visual inspection.

6.4 Melt Flow Rate Test The melt flow rate test shall be carried out by using granular sample given in 6.1 (3) in accordance with 4.1 of JIS K 6760.

6.5 Density Test The density test shall be made by using the test piece given in 6.1 in accordance with 4.2 of JIS K 6760. The testing temperature, in this case, shall be 23 ± 0.1°C.

6.6 Tensile Test The tenside test shall be made by using the test piece given in 6.1 in accordance with JIS K 7113, and tensile yield strength and tensile elongation at rupture shall be obtained. In this case, the gauge length shall be 20 mm, and the testing speed shall be 200 ± 20 mm per min.

Generally, the testing temperature shall be 23 ± 2°C, and when the test is carried out at a temperature of 20 ± 2°C, the obtained value shall be converted to that at 23°C from the following formula.

$$\sigma_{y23}=\sigma_{y20}-\sigma_{yc}$$

where σ_{y23}: tensile yield strength at 23°C (MPa) {kgf/cm²}

σ_{y20}: tensile yield strength at 20 ± 2°C (MPa) {kgf/cm²}

σ_{yc}: 0.74 MPa {7.5 kgf/cm²}

6.7 Charpy Impact Test The charpy impact test shall be made by using the test piece given in 6.1 in accordance with JIS K 7111. In this case, the distance between the test piece supporters shall be 60 mm. The test shall be carried out on seven test pieces, and the average of five test values excepting the maximum and the minimum values shall be obtained.

6.8 Ring Tensile Test The ring tensile test shall be made according to JIS K 7113, as appropriate, after attaching the test piece given in 6.1 to a tensile testing machine by using the ring tensile test jig given in Fig. 6, and tensile yield strength shall be calculated from the following formula. In this case, the test speed shall be 200 ± 20 mm per min, and the test temperature shall be generally 23 ± 2°C.

$$\sigma_y=\frac{P}{2\times t\times b}$$

where σ_y: tensile yield strength (MPa) {kgf/cm²}

P: load at tensile yield (N) {kgf}

t: thickness of test piece (mm) {cm}

b: width of test piece (mm) {cm}

Further, when tested at 20 ± 2°C, the obtained value shall be converted to that at 23°C from the following formula:

$$\sigma_{y23}=\sigma_{y20}-\sigma_{yc}$$

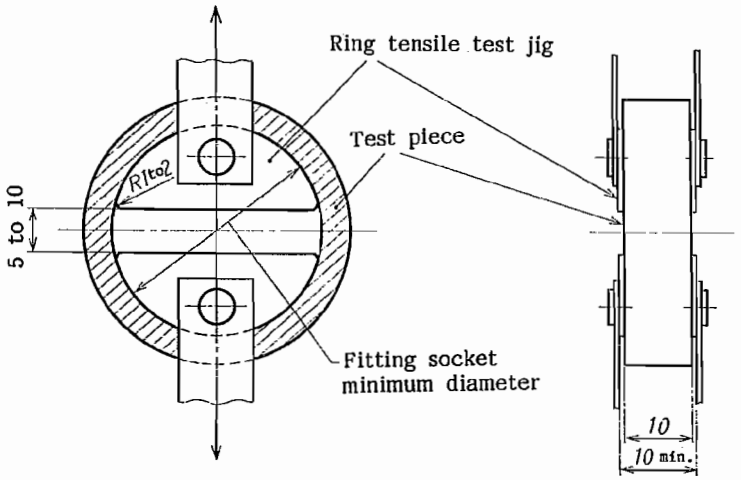
where σ_{y23}: tensile yield strength at 23°C (MPa) {kgf/cm²}

σ_{y20}: tensile yield strength at 20 ± 2°C (MPa) {kgf/cm²}

σ_{yc}: 0.74 MPa {7.5 kgf/cm²}

Fig. 6. Ring Tensile Test Jig

Unit: mm



6.9 Burst Hydraulic Test The burst hydraulic test shall be made as follows: Mount the test piece given in 6.1 on a hydraulic tester, apply pressure at a constant speed, measure the maximum pressure until the pipe or fitting bursts, and express it by the average of three values.

For the test, use water of 23 $^{+5}_{-2}$ °C, and allow the time required from the start of pressurizing to the maximum prersure to be 60 sec. or more.

6.10 Elongation Test at Elevated Temperature The elongation test at elevated temperature shall be made as follows: Select positions for measuring the outside diameter, length, and angle on an optional surface of the test piece shown in 6.1, and attach gauge marks. After measuring the outside diameter, length, and angle at the positions of the gauge marks, immerse in polyethylene glycol at 110 ± 2°C for 1 h. Thereafter, take the test piece out. After naturally cooling in air at 23 ± 2°C, measure the outside diameter, length, and angle at the positions of the gauge marks, calculate the variation rate and the variation from the following formula, and obtain respectively the average of three obtained values.

$$l = \frac{l_1 - l_0}{l_0} \times 100$$

where l : variation rate of outside diameter or length (%)

l_0 : outside diameter or length before test (mm)

l_1 : outside diameter or length after test (mm)

$$\theta = \theta_1 - \theta_0$$

where θ : variation of angle (°)

θ_0 : angle before test (°)

θ_1 : angle after test (°)

6.11 Hot Internal Pressure Creep Test The hot internal pressure creep test shall be made as follows: Use the test piece given in 6.1, fill it with water, air, nitrogen, or other inert gas of the pressure given in Table 15, immerse in hot water at 80 ± 1°C for 30 h, and examine the presence of cracks and other defects by visual inspection. In this case, when ductility breakage takes place, discard this test piece, and allow the retest to be executed.

Table 15. Pressure of Hot Internal Pressure Creep Test

Type	Pressure ([16]) MPa {kgf/cm^2}
No. 1	0.93 {9.5}
No. 1 U	0.75 {7.6}
No. 2	0.58 {5.9}
No. 3	0.47 {4.8}

Note ([16]) Tolerance on pressure shall be ± 0.03 MPa {0.3 kgf/cm^2}.

Remark: The test may be performed by using 100 in designation for No. 1, No. 1 U and No. 2 and 150 in designation for No. 3 concerning a fitting of over 100 in designation subject to the agreement between the delivery parties concerned.

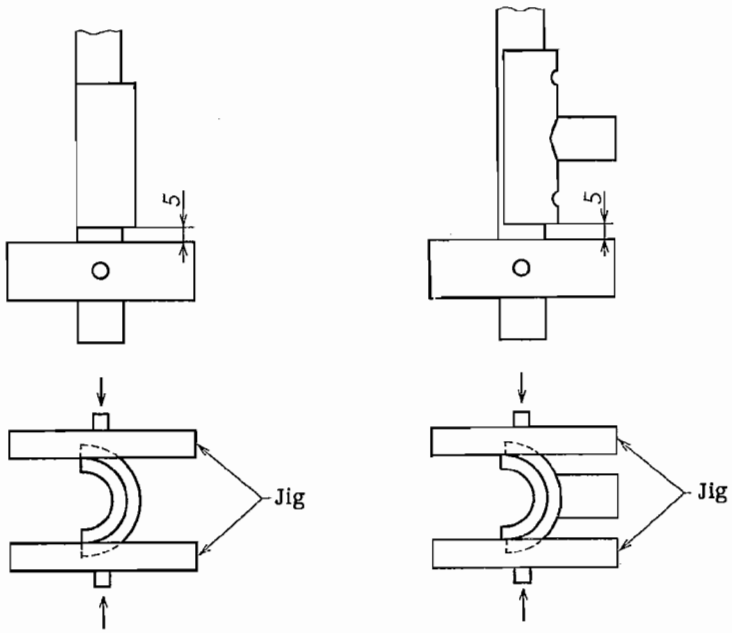
6.12 Compression Peel Test The compression peel test shall be made as follows: After measuring a distance between both ends of the heating wire of the fusion junction of the test piece given in 6.1, set a jig as given in Fig. 7, fasten the jig until the inside surface of a pipe comes in contact therewith, keep for 10 min, and examine the state of the interface.

Further, measure the peel length of the heating wire part, and obtain the ratio of the funsion junction to the distance between both ends of the heating wire (peel length rate).

In this case, allow the test speed to be 100 ± 10 mm per min, and allow the test temperature to be 23 ± 2°C.

Fig. 7. Compression Peel Test

Unit: mm



6.13 Environmental Stress Cracking Test for Material The environmental stress cracking test for material shall be carried out by using the test piece given in 6.1 in accordance with 4.7 of JIS K 6760.

6.14 Immersion Test The immersion test shall be made as follows: After immersing the test piece given in 6.1 into respective test solutions given in Table 16 at 23 ± 2°C for 72 h, wipe the test solution off with a dry cloth, and quickly measure the mass. After measuring the mass, quickly cut out the test piece given in Fig. 1, measure tensile yield strength in accordance with 6.6, calculate each variation rate from the following formula, and obtain the average of three tested values.

$$w=\frac{W_1-W_0}{\alpha}$$

where w: mass variation rate per surface area {mg/cm²}

W_0: mass before test (mg)

W_1: mass after test (mg)

α: surface area of test piece before test {cm²}

$$\sigma=\frac{\sigma_1-\sigma_0}{\sigma_0}\times 100$$

where σ : variation rate of tensile yield strength (%)

σ_0 : tensile yield strength before the test (MPa) {kgf/cm²}

σ_1 : tensile yield strength after the test (MPa) {kgf/cm²}

Table 16. Test Solution for Immersion Test

Test solution	Density	Remark
Liquid paraffin	100 %	ISO VG 15 specified in JIS K 2231 or those equal or superior thereto.
Mixture of tertial butyl mercaptan and liquid paraffin	Dilute to 5 v/v % with liquid paraffin	-
* Methanol	100 %	JIS K 8891
* Isopropanol		JIS K 8839
* Ethylene glycol		JIS K 8105
Mixture of benzene and methanol	Dilute to 20 v/v % with methanol	JIS K 8858

Remark: It is permitted to furnish any one solution of the solution with * to the test.

6.15 Weathering Test The weathering test shall be made as follows: After exposing the test piece given in 6.1 in a WS type accelerated artificial exposure testing apparatus by the method specified in JIS A 1415 for 600 h, carry out the tensile test in accordance with the method of 6.6, measure the distance between the marked lines when the test piece breakes, and calculate the reduction rate of elongation from the following formula. In this case, allow the test speed to be 50 ± 5 mm per minute.

$$\varepsilon = \frac{\varepsilon_0 - \varepsilon_1}{\varepsilon_0} \times 100$$

where ε : reduction rate of elongation (%)

ε_0 : mean value of elongation before the test (%)

ε_1 : mean value of elongation after the test (%)

6.16 Long Term Hot Internal Pressure Creep Test The long term hot internal pressure creep test shall be carried out in accordance with 6.11. In this case, the pressure shall be as given in Table 17. The test piece shall be immersed into hot water at 80 ± 1°C for 72 h, and the presence of cracks and other defects shall be examined by visual inspection.

Table 17. Pressure of Long Term Hot Internal Pressure Creep Test

Type of pipe to be joined	Pressure ([16]) MPa {kgf/cm²}
No. 1	0.78 {8.0}
No. 1 U	0.63 {6.4}
No. 2	0.49 {5.0}
No. 3	0.39 {4.0}

Remark: The test may be performed by using 100 in designation for No. 1, No. 1 U and No. 2 and 150 in designation for No. 3 in the case of fittings of over 100 in designation subject to the agreement between the delivery parties concerned.

7. Inspection

The inspection shall be classified into the type inspection ([17]) and the acceptance inspection ([18]). The inspection shall be carried out in accordance with the testing method given in 6., and the results shall meet the requirements of 3., 4. and 5.

Further, the sampling inspection plan to be used for the type inspection and acceptance inspection shall be as agreed upon between the delivery parties concerned.

Notes ([17]) The type inspection means an inspection to judge whether the qualities of products can satisfy all of the characteristics intended by design.

([18]) The acceptance inspection means an inspection to judge whether the characteristics recognized necessary upon the acceptance of products which are of same design and manufacture to those which have already passed the type inspection are satisfactory or not.

(1) Type inspection

(1.1) Inspection of fitting

(a) Appearance and shape inspection

(b) Dimensional inspection

(c) Ring tensile inspection

(d) Burst hydraulic inspection

(e) Elongation inspection at elevated temperature

(f) Hot internal pressure creep inspection

(g) Compression peel inspection

(h) Long term hot internal pressure creep inspection

(1.2) Inspection of material

(a) Melt flow rate inspection

(b) Density inspection

(c) Tensile inspection

(d) Charpy impact inspection

(e) Environmental stress cracking inspection for material

(f) Immersion inspection

(g) Weathering inspection

(2) Acceptance inspection

(a) Appearance and shape inspection

(b) Dimensional inspection

(c) Ring tensile inspection

(d) Burst hydraulic inspection

(e) Elongation inspection at elevated temperature

(f) Hot internal pressure creep inspection

(g) Compression peel inspection

8. Expression of Numerical Value of Test Results

The test results shall be obtained down to one place blow the specified numerical value, and shall be rounded off according to the rule of JIS Z 8401.

9. Marking

The fittings shall be marked with the following particulars on the outside thereof by an indelible means.

(1) Melt flow rate of material to be used and type of pipe to be joined (Example; For class A No. 1 of butt junction fitting, A-1; For class A No. 1 U, A-1 U)

(2) Designation

(3) Year and month of manufacture or the abbreviation thereof

(4) Manufacturer's name or the abbreviation thereof

Appendix. Fusion Junction Performance Test

1. Scope

This test specifies the method for evaluation of the fusion compatibility of fittings.

2. Test Items

The fusion junction performance test items shall be as given in Appendix Table 1.

Appendix Table 1. Test Items

Number	Test items
(1)	Tensile test
(2)	Original pipe tensile test
(3)	Charpy impact test
(4)	Drop impact test
(5)	Burst hydraulic test
(6)	Hot internal pressure creep test. However, it may be replaced by short term test of all around notch type tensile creep test or short term test of all around notch type tensile fatigue test for butt junction fittings.
(7)	Long term hot internal pressure creep test. However, it may be replaced by long term test of all around notch type tensile creep test or long term test of all around notch type tensile fatigue test for butt junction fittings.
(8)	Compression peel test
(9)	Environmental stress cracking test

3. Testing Method

3.1 Test Piece

(1) For a specimen fitting, not less than one type of the type of junction shape and the designation may be selected, and fusion bonding conditions may be determined as agreed upon between the parties concerned with delivery.

(2) The preparation method and conditioning of the test piece used for a fusion junction performance test shall be in accordance with Appendix Table 2.

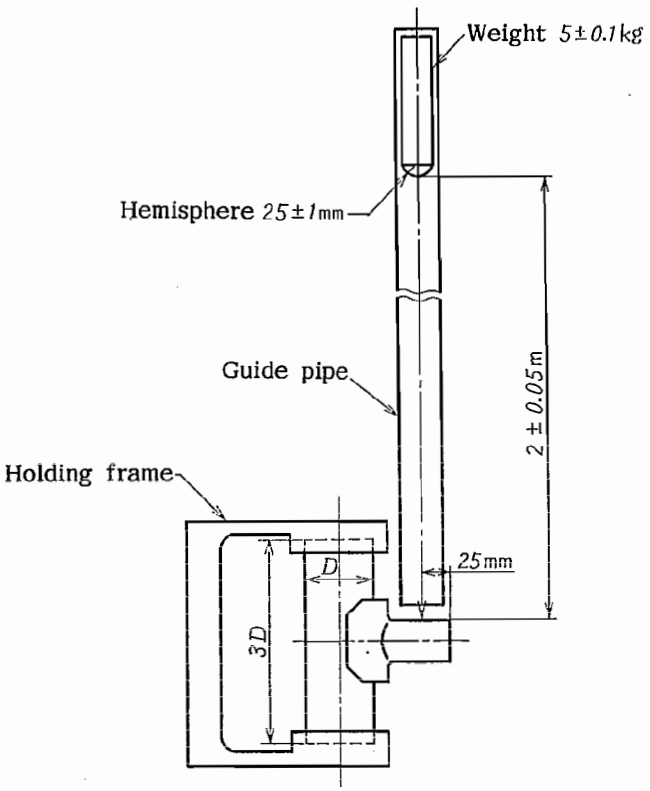
3.2 Tensile Test The tensile test shall be carried out by using the test piece given in Appendix 3.1 in accordance with 6.6 in Body.

3.3 Original Pipe Tensile Test After setting the test piece given in Appendix 3.1 to a tensile tester, the original pipe tensile test shall be carried out in accordance with JIS K 7113. In this case, the test speed shall be 200 ± 20 mm per min and the test temperature shall be generally 23 ± 2°C.

3.4 Charpy Impact Test The Charpy impact test shall be carried out by using the test piece given in Appendix 3.1 in accordance with 6.7 in Body. In this case, the number of test pieces shall be 12 pieces, and the mean value of ten test values excepting the maximum and the minimum values, obtained.

3.5 Drop Impact Test After setting the test piece given in Appendix 3.1 to the drop impact tester given in Appendix Fig. 1, a falling weight is dropped from a height of 2 ± 0.05 m, and the interface state of the fusion junction shall be examined by visual inspection for the drop impact test. The mass of the falling weight shall be 5 ± 0.1 kg, and the shape of its top, a hemispherical state of 25 ± 1 mm. In this case, the test temperature shall be 23 ± 2°C.

Appendix Fig. 1. An Example of Drop Impact Tester



3.6 Burst Hydraulic Test The burst hydraulic test shall be carried out by using the test piece given in Appendix 3.1 in accordance with 6.9 in Body.

3.7 Hot Internal Pressure Creep Test The hot internal pressure creep test shall be carried out by using the test piece given in Appendix 3.1 in accordance with 6.11 in Body.

3.8 Long Term Hot Internal Pressure Creep Test The long term hot internal pressure creep test shall be carried out by using the test piece given in Appendix 3.1 in accordance with 6.16 in Body.

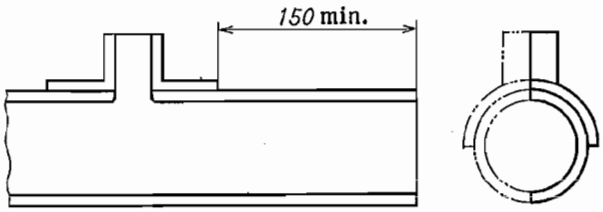
3.9 All Around Notch Type Tensile Creep Test The all around notch type tensile creep test shall be carried out by using the test piece given in Appendix 3.1 in accordance with Appendix 1 of JIS K 6774. In this case, the immersion time shall be 5 h for a short term test and 9 h for a long term test.

3.10 All Around Notch Type Tensile Fatigue Test The all around notch type tensile fatigue test shall be carried out by using the test piece given in Appendix 3.1 in accordance with Appendix 2 of JIS K 6774. In this case, the number of repetition shall be 1100 times for a short term test and 2900 times for a long term test.

3.11 Compression Peel Test The compression peel test shall be carried out by using the test piece given in Appendix 3.1 in accordance with 6.12 in Body. However, for saddle junction fittings and heating-wire-containing saddle junction fittings, the test piece given in Appendix Fig. 2 may be used as agreed upon between the delivery parties concerned.

Appendix Fig. 2. Test Piece for Compression Peel Test

Unit: mm



3.12 Environmental Stress Cracking Test The environmental stress cracking test shall be carried out by using the test piece given in Appendix 3.1 in accordance with 6.13 in Body.

Appendix Table 2. Test Piece for Fusion Junction Performance Test

Test item	Test piece					Type of junction shape		
	Shape	Preparation method	Number of pieces	Conditioning		Butt junction	Bayonet junction, wire heating-wire bayonet junction, and spigot type bayonet junction	Saddle junction and heating-wire containing saddle junction
				Temperature °C	Time h			
Tensile test	Body Fig. 1	Cut out from a longitudinal direction of the butt junction of a specimen fitting so that the fusion bonding part is at center, cut beads on both faces by machining, and prepare the test piece shape specified in Body Fig. 1 of JIS K 6774.	3	23 ± 2	1 min. However, the test piece shall be left at ordinary temperature for not less than 24 after fusion bonding.	○	–	–
Original pipe tensile test	Fitting	Join a length of 3 D min. of No. 1 pipe to a bayonet junction fitting.				–	○	–
Charpy impact test	Body Fig. 2	Cut out from a longitudinal direction of the butt junction of a specimen fitting so that the fusion bonding part becomes central, cut beads on both faces by machining, and prepare the test piece shape specified in Body Fig. 2. In that case, notch at the center of the fusion bonding part.	12			○	–	–

Appendix Table 2 (Continued)

Test item	Test piece					Type of junction shape		
	Shape	Preparation method	Number of pieces	Conditioning		Butt junction	Bayonet junction, wire heating-wire bayonet junction, and spigot type bayonet junction	Saddle junction and heating-wire containing saddle junction
				Temperature °C	Time h			
Drop impact test	Fitting	Join a length of 3 D min. of No. 1 pipe to a specimen junction by fusion as given in Appendix Fig. 1.	3	23 ± 2	1 min. However, the test piece shall be left at ordinary temperature for not less than 24 after fusion bonding.	–	–	○
Burst hydraulic test		As described in Body 6.1.		23 $^{+5}_{-2}$		○	○	○
Hot internal pressure creep test		As described in Body 6.1.		80 ± 1		○	○	○
Long term hot internal pressure creep test		As described in Body 6.1.		80 ± 1		○	○	○

Appendix Table 2 (Continued)

Test item	Test piece					Type of junction shape		
	Shape	Preparation method	Number of pieces	Conditioning		Butt junction	Bayonet junction, wire heating-wire bayonet junction, and spigot type bayonet junction	Saddle junction and heating-wire containing saddle junction
				Temperature °C	Time h			
All around notch type tensile creep test	JIS K 6774 Appendix 1 Fig. 1	Cut out from a longitudinal direction of the butt junction of a specimen fitting so that the fusion bonding part is at cnter, cut beads on both faces by machining, and prepare the test piece shape specified in Appendix 1 Fig. 1 of JIS K 6774. In this case, notch at the center of the fusion bonding part.	3	80 ± 1	1 min. However, the test piece shall be left at ordinary temperature for not less than 24 after fusion bonding.	○	–	–
All around notch type tensile fatigue test								
Compression peel test	Body Fig. 4 or Appendix Fig. 2	As described in Body 6.1.	3	23 ± 2		–	○	○

Appendix Table 2. (Continued)

Test item	Test piece					Type of junction shape		
	Shape	Preparation method	Number of pieces	Conditioning		Butt junction	Bayonet junction, wire heating-wire bayonet junction, and spigot type bayonet junction	Saddle junction and heating-wire containing saddle junction
				Temperature °C	Time h			
Environmental stress cracking test	Body Fig. 5	Cut out from a longitudinal direction of the butt junction of a specimen fitting so that the fusion bonding part is at center, cut beads on both faces by machining, and prepare the test piece shape specified in Body Fig. 5.	10	23 ± 2	1 min. However, the test piece shall be left at ordinary temperature for not less than 24 after fusion bonding.	○	–	–

4. Judgement

The criteria for judging whether standard performances are satisfied or not shall be in accordance with Appendix Table 3.

Appendix Table 3. Criteria

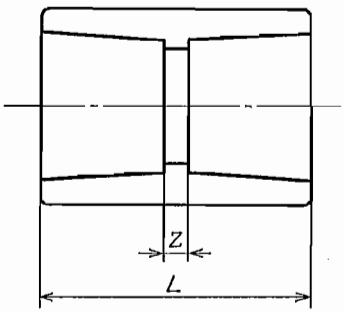
Test item	Criteria
Tensile test	Tensile yield strength 17.7 MPa {180 kgf/cm^2} min.
Original pipe tensile test	The fusion junction shall be free from rupture and other defects.
Charpy impact test	6.9 kJ/m^2 {7 kgf · cm/cm^2} min.
Drop impact test	The fusion junction shall be free from rupture and other defects.
Burst hydraulic test	No. 1 maximum pressure 3.43 MPa {35 kgf/cm^2} min. No. 1 U maximum pressure 2.75 MPa {28 kgf/cm^2} min. No. 2 maximum pressure 2.16 MPa {22 kgf/cm^2} min. No. 3 maximum pressure 1.67 MPa {17 kgf/cm^2} min.
Hot internal pressure creep test	Not to show cracks and other defects.
Long term hot internal pressure creep test	Not to show cracks and other defects.
All around notch type tensile creep test	No break (short term test and long term test)
All around notch type tensile fatigue test	No break (short term test and long term test)
Compression peel test	The peel length rate of the fusion junction shall be 15 % max. and other defects, not be generated.
Environmental stress cracking test	Time required for generation 50 % cracking 240 h min.

Reference. Types of Fitting Shapes and Dimensions of Fittings Excepting Junction

The common dimensions of a junction shall be as described in Body 4.

Reference Fig. 1. Socket

(1) Bayonet Junction Fitting

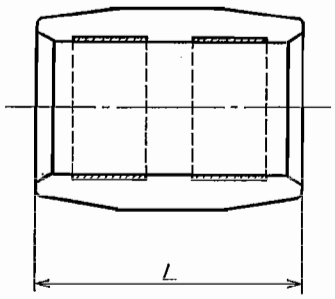


Unit: mm

Designation \ Symbol	L (1)	Z
20	48	4
25	52	4
30	54	4
40	61	5
50	66	6
75	79	7
100	90	8

Note (1) Permissible deviations on L shall be ± 2 mm.

(2) Heating-Wire-Containing Bayonet Junction Fitting

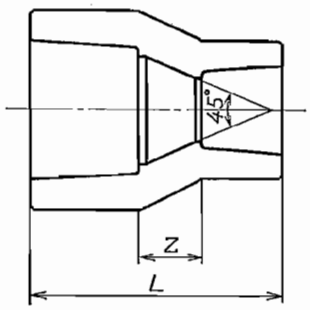


Unit: mm

Designation \ Symbol	L
20	66
25	70
30	76
40	82
50	92
75	116
100	142
150	176
200	206

Reference Fig. 2. Different Diameter Socket

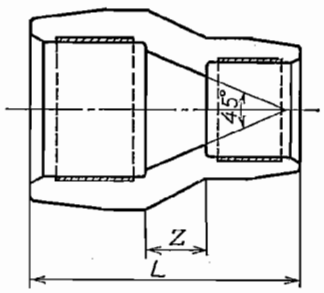
(1) Bayonet Junction Fitting



Unit: mm

Symbol / Designation	L (1)	Z
25×20	57	11
30×25	61	12
40×30	68	15
50×40	81	23
75×50	107	41
100×75	116	39

(2) Heating-Wire-Containing Bayonet Junction Fitting



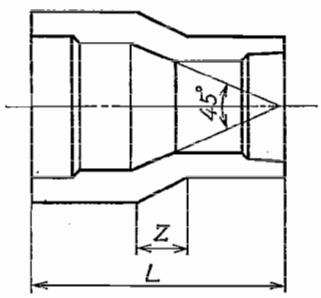
Unit: mm

Symbol / Designation	L	Z
25× 20	75	7
30× 25	81	8
40× 30	85	6
50× 40	99	12
75× 50	132	28
100× 75	153	24
150×100	208	49
200×150	239	48

Reference Fig. 3. Reducer

(1) Butt Junction Fitting

(a) KŌ (Japanese) type



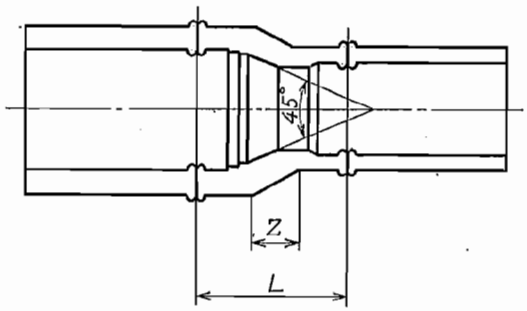
Unit: mm

Symbol / Designation	L (2)	Z
75× 50	224	34
100× 75	220	30
150×100	202	32
200×150	196	26

Note (2) L shall be the minimum value.

Reference Fig. 3 (Continued)

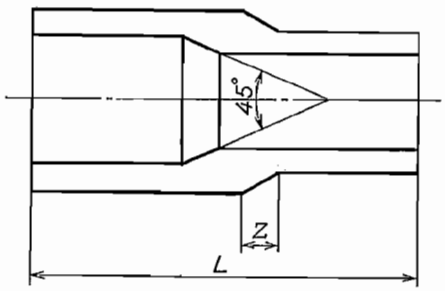
(b) OTSU (Japanese) type



Unit: mm

Designation \ Symbol	L (2)	Z
200×150	56	26

(2) Spigot Type Bayonet Junction Fitting

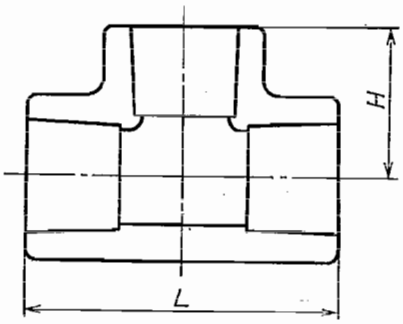


Unit: mm

Designation \ Symbol	L (2)	Z
25×20	97	9
30×25	103	10
40×30	107	8
50×40	122	15

Reference Fig. 4. Tees

(1) Bayonet Junction Fittings



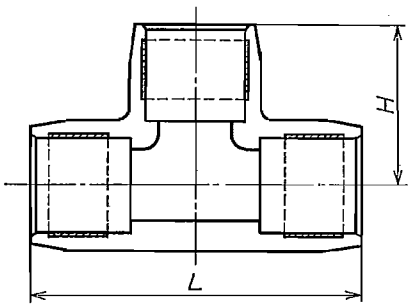
Unit: mm

Designation \ Symbol	L (1)	H (3)
20	82	41
25	94	47
30	106	53
40	118	59
50	138	69
75	190	95
100	232	116

Note (3) Permissible deviations on H shall be + 2 mm.

Reference Fig. 4 (Continued)

(2) Heating-Wire-Containing Bayonet Junction Fittings

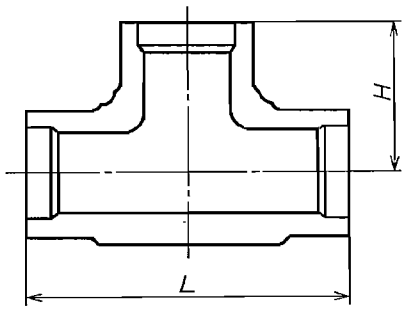


Unit: mm

Designation \ Symbol	L	H
20	100	50
25	112	56
30	128	64
40	140	70
50	166	83
75	224	112
100	280	140
150	376	188
200	468	234

(3) Butt Junction Fittings

(a) KŌ (Japanese) type

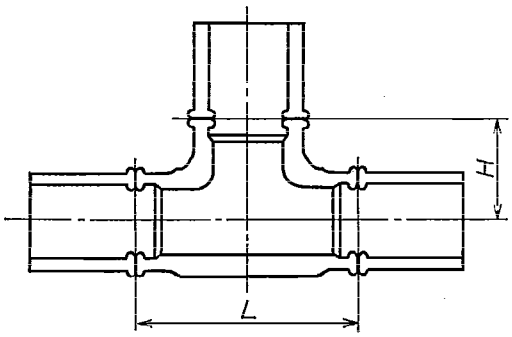


Unit: mm

Designation \ Symbol	L(2)	H(4)
50	266	133
75	308	154
100	342	171
150	420	210
200	492	246

Note (4) H shall be the minimum value.

(b) OTU (Japanese) type

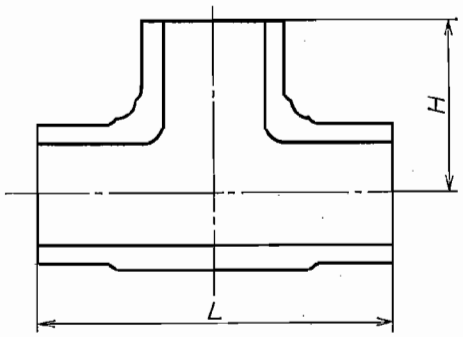


Unit: mm

Designation \ Symbol	L(2)	H(4)
150	280	140
200	352	176

Reference Fig. 4 (Continued)

(4) Spigot Type Bayonet Junction Fittings

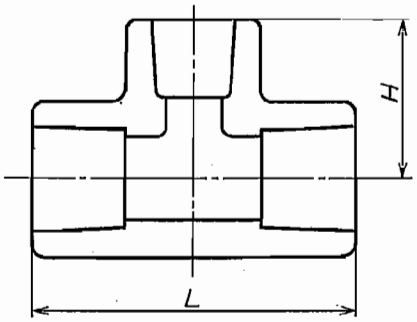


Unit: mm

Designation \ Symbol	L (2)	H (4)
20	120	60
25	132	66
30	148	74
40	162	81

Reference Fig. 5. Different Diameter Tees

(1) Bayonet Junction Fittings

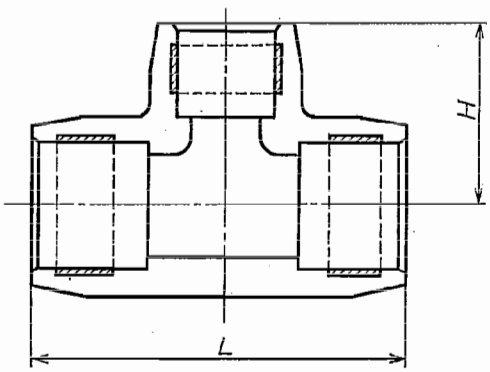


Unit: mm

Designation \ Symbol	L (1)	H (3)
25×20(5)	94	47
30×20(5)	96	52
30×25		

Note (5) The outside diameter of a bayonet junction of 20 in designation shall be as same as that of 25 in designation.

(2) Heating-Wire-Containing Bayonet Junction Fittings

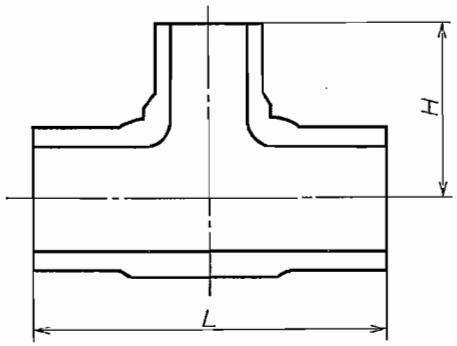


Unit: mm

Designation \ Symbol	L	H
25×20(5)	105	54
30×20(5)	119	61
30×25		

Reference Fig. 5 (Continued)

(3) Spigot Type Bayonet Junction Fittings

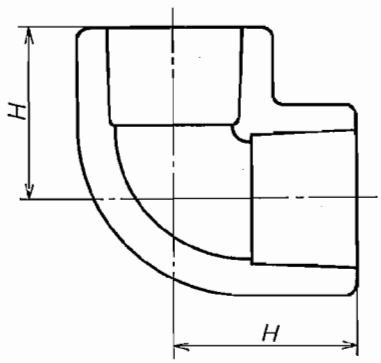


Unit: mm

Designation \ Symbol	L(2)	H(4)
25×20	124	63
30×20	131	68
30×25	139	70

Reference Fig. 6. Elbow

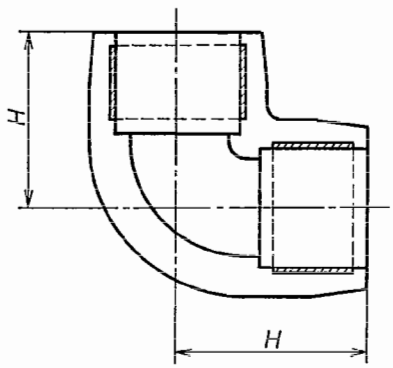
(1) Bayonet Junction Fittings



Unit: mm

Designation \ Symbol	H(3)
20	41
25	47
30	53
40	59
50	69
75	95
100	116

(2) Heating-Wire-Containing Bayonet Junction Fittings



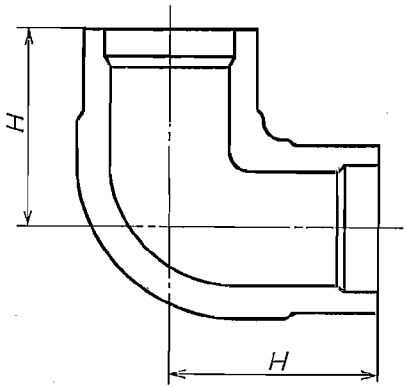
Unit: mm

Designation \ Symbol	H
20	50
25	56
30	64
40	70
50	83
75	112
100	140
150	188
200	234

Reference Fig. 6 (Continued)

(3) Butt Junction Fittings

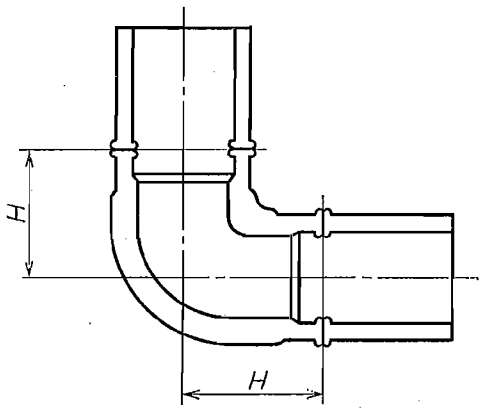
(a) KŌ (Japanese) type



Unit: mm

Designation \ Symbol	H(4)
50	133
75	154
100	171
150	210
200	246

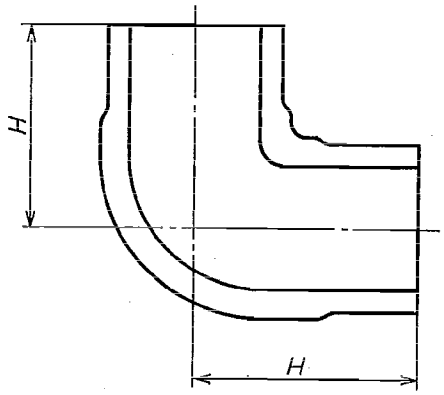
(b) OTSU (Japanese) type



Unit: mm

Designation \ Symbol	H(4)
150	140
200	176

(4) Spigot Type Bayonet Junction Fittings

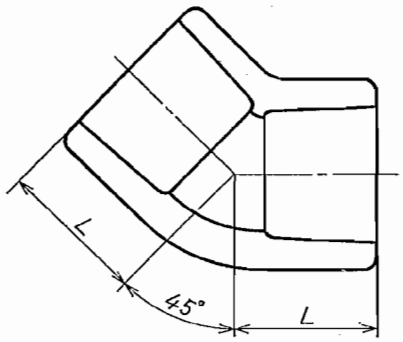


Unit: mm

Designation \ Symbol	H(4)
20	60
25	66
30	74
40	81

Reference Fig. 7. 45° Elbow

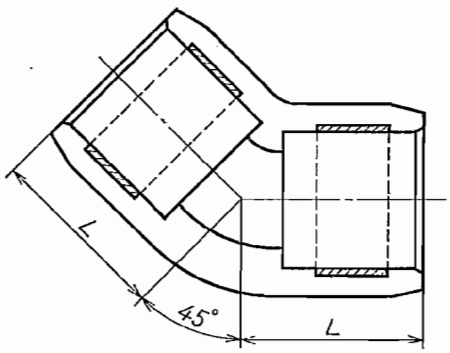
(1) Bayonet Junction Fittings



Unit: mm

Symbol / Designation	L (1)
75	59
100	70

(2) Heating-Wire-Containing Bayonet Junction Fittings

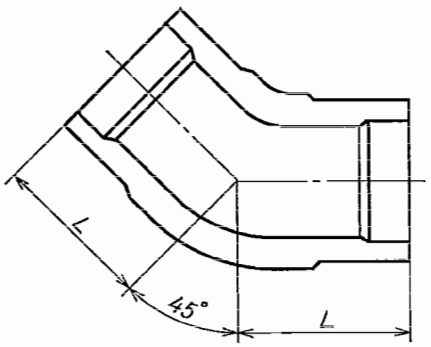


Unit: mm

Symbol / Designation	L
75	82
100	102
150	132
200	161

(3) Butt Junction Fittings

(a) KŌ (Japanese) type

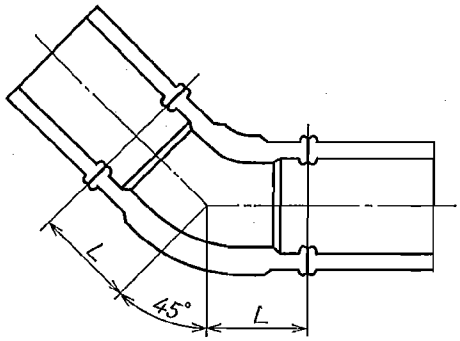


Unit: mm

Symbol / Designation	L (2)
50	115
75	124
100	133
150	154
200	173

Reference Fig. 7 (Continued)

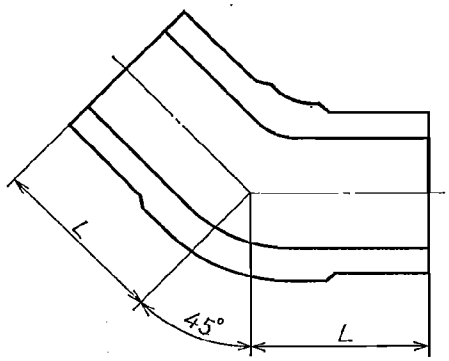
(b) OTSU (Japanese) type



Unit: mm

Designation \ Symbol	L (2)
150	84
200	103

(4) Spigot Type Bayonet Junction Fittings

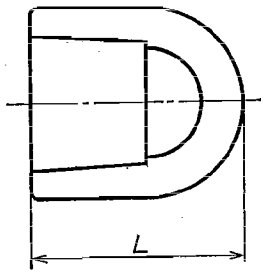


Unit: mm

Designation \ Symbol	L (2)
20	50
25	54
30	60
40	65

Reference Fig. 8. Cap

(1) Bayonet Junction Fittings

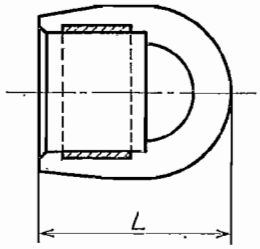


Unit: mm

Designation \ Symbol	L (1)
20	41
25	47
30	53
40	59
50	69
75	95
100	116

Reference Fig. 8 (Continued)

(2) Heating-Wire-Containing Bayonet Junction Fittings

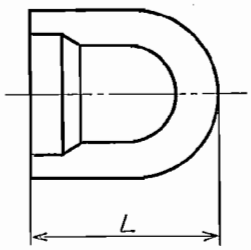


Unit: mm

Designation \ Symbol	L
20	51
25	57
30	64
40	71
50	83
75	113
100	142
150	190
200	236

(3) Butt Junction Fittings

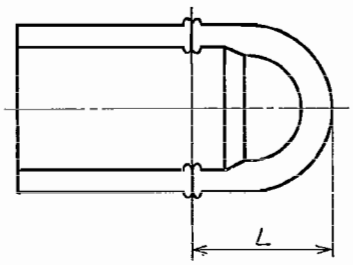
(a) KŌ (Japanese) Type



Unit: mm

Designation \ Symbol	L (2)
50	115
75	130
100	142
150	168
200	193

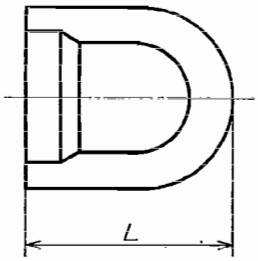
(b) OTSU (Japanese) Type



Unit: mm

Designation \ Symbol	L (2)
150	98
200	123

(4) Spigot Type Bayonet Junction Fittings

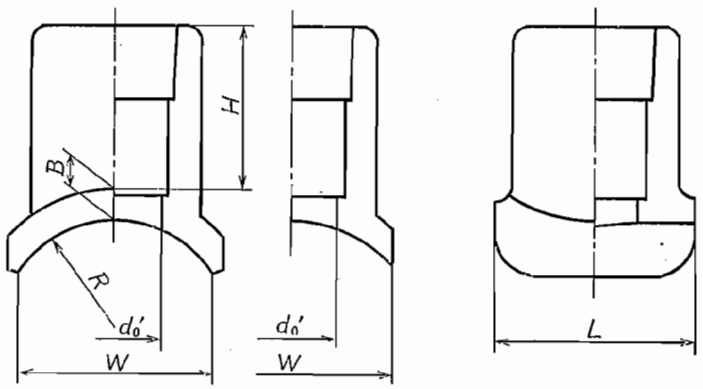


Unit: mm

Designation \ Symbol	L (2)
20	47
25	52
30	59
40	65

Reference Fig. 9. Saddle

(1) Saddle

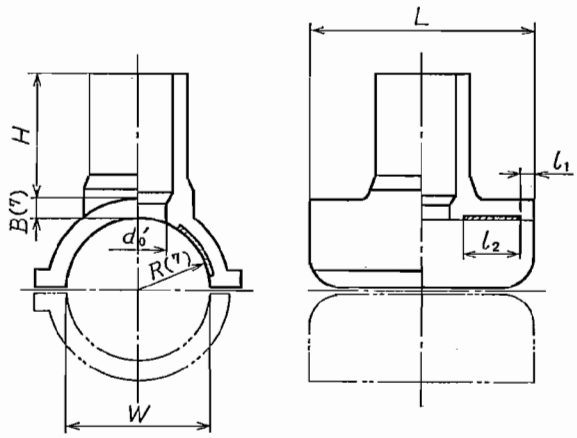


Unit: mm

Symbol / Designation	W	L	H	B	d_0'	R
40×20(5)	46	70	63	10	18	24
40×25					24	
40×30					31	
50×20(5)	56	75			18	30
50×25					24	
50×30					31	
50×40					36	
75×20(5)	65				18	44.5
75×25					24	
75×30					31	
75×40					36	
75×50	78	92	90		46	
100×20(5)	65	75	63		18	57
100×25					24	
100×30					31	
100×40					36	
100×50	87	92	90		46	
100×75	108	135			68	
150×20(5)	65	75	63		18	82.5
150×25					24	
150×30					31	
150×40					36	
150×50	87	92	90		46	
150×75	122	135			68	
200×20(5)	65	75	63		18	108
200×25					24	
200×30					31	
200×40					36	
200×50	87	92	90		46	
200×75	122	135			68	

Reference Fig. 9 (Continued)

(2) Heating-Wire-Containing Saddle



Unit: mm

Symbol / Designation	W	L	H	d_0'	l_1(6)	l_2(6)
40× 20	48	105	44	18	5	22
40× 25				24		
40× 30			48	31		23
50× 20	60	110	44	18		22
50× 25				24		
50× 30			48	31		23
50× 40			52	36		24
50× 50			58	46		28
75× 20	86		44	18		22
75× 25				24		
75× 30			48	31		23
75× 40			52	36		24
75× 50	89	130	58	46		28
75× 75		175	101	68		37
100× 20	100	110	44	18		22
100× 25				24		
100× 30			48	31		23
100× 40			52	36		24
100× 50	114	130	58	46		28
100× 75		175	101	68		37
100×100		210	104	88		44
150× 20	108	110	44	18		22
150× 25				24		
150× 30			48	31		23
150× 40			52	36		24
150× 50	150	130	58	46		28
150× 75		175	101	68		37
150×100	165	210	104	88		44
150×150		290	113	129		60
200× 20	112	110	44	18		22
200× 25				24		
200× 30			48	31		23
200× 40			52	36		24
200× 50	160	130	58	46		28
200× 75		175	101	68		37
200×100	180	210	104	88		44
200×150	216	290	113	129		60
200×200		370	135	169		75

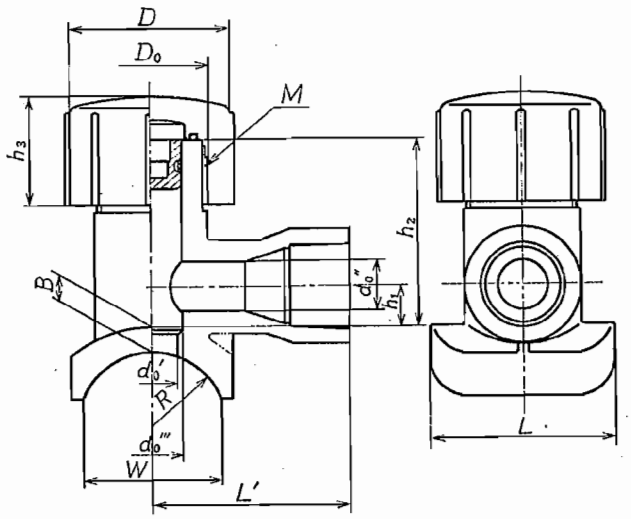
Notes (6) l_1, l_2 in dimension shall be the minimum values.

(7) R, B in dimension shall be same as dimensions of saddle in Reference Fig. 9.

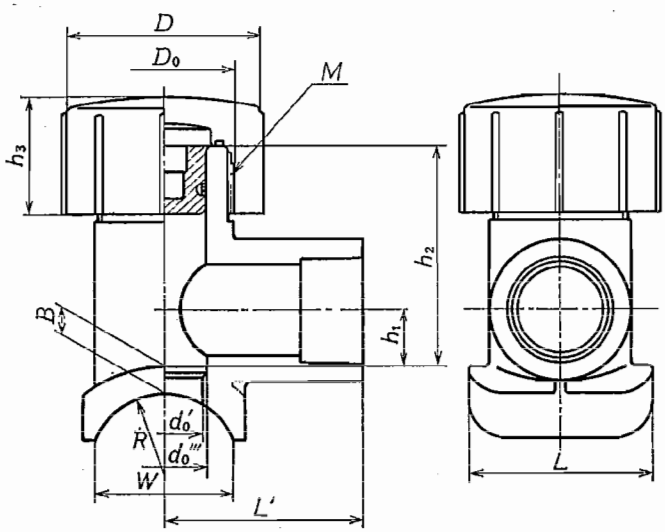
Reference Fig. 10. Service Tee

(1) Service Tee

(a)



(b)



Reference Fig. 10 (Continued)

(1) Service Tee (continued)

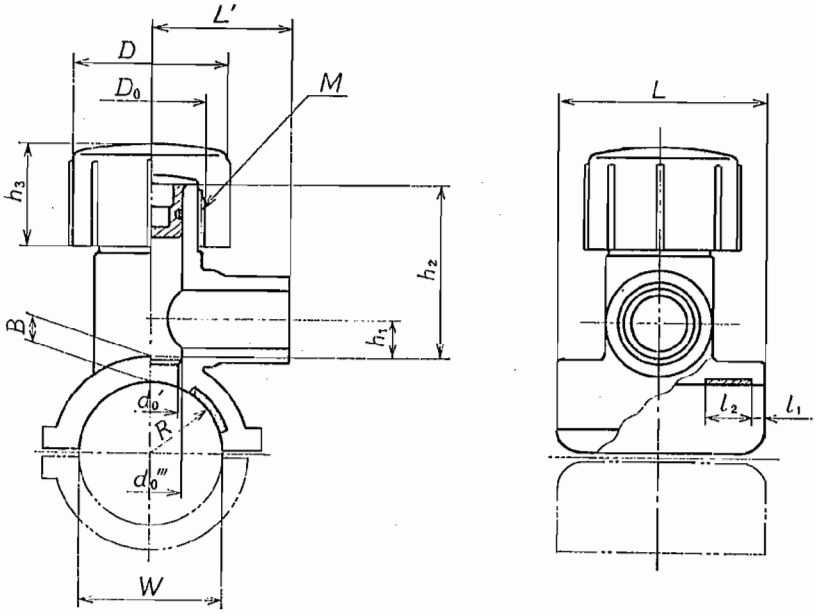
Unit: mm

Designation \ Symbol	W	L	h_1	h_2	h_3	D	D_0	B	R	d_0'	d_0''	d_0'''	M(8)	L'
40×20(5)	46	70	16	74	44	65	46	10	24	18	—	26	M 45×3	80
40×25										24	20			
40×30			22	87	47	78.4	56			31	—	34	M 55×3	90
50×20(5)	56	75	16	74	44	65	46		30	18	—	26	M 45×3	80
50×25										24	20			
50×30			22	87	47	78.4	56			31	—	34	M 55×3	90
75×20(5)	65		16	74	44	65	46		44.5	18	—	26	M 45×3	80
75×25										24	20			
75×30			22	87	47	78.4	56			31	—	34	M 55×3	90
100×20(5)			16	74	44	65	46		57	18	—	26	M 45×3	80
100×25										24	20			
100×30			22	87	47	78.4	56			31	—	34	M 55×3	90
150×20(5)			16	74	44	65	46		82.5	18	—	26	M 45×3	80
150×25										24	20			
150×30			22	87	47	78.4	56			31	—	34	M 55×3	90
200×20(5)			16	74	44	65	46		108	18	—	26	M 45×3	80
200×25										24	20			
200×30			22	87	47	78.4	56			31	—	34	M 55×3	90

Note (8) The threaded portion shall be in accordance to JIS B 0207 as appropriate.

Reference Fig. 10 (Continued)

(2) Heating-Wire-Containing Service Tee



Unit: mm

Symbol / Designation	W	L	h_1	h_2	l_1(6)	l_2(6)	L'
40×20(5)	48	105	19	76	5	22	65
40×25							
40×30			21	85		23	73
50×20(5)	60	110	19	76		22	65
50×25							
50×30			21	85		23	73
75×20(5)	86		19	76		22	65
75×25							
75×30			21	85		23	73
100×20(5)	100		22	79		22	65
100×25							
100×30			25	89		23	73
150×20(5)	108		22	79		22	65
150×25							
150×30			25	89		23	73
200×20(5)	112		22	79		22	65
200×25							
200×30			25	89		23	73

Remark: h_3, D, D_0, B, R, d_0', d_0''', and M in dimension shall be same as ろ。 dimensions of the service tee in Reference Fig. 10.

Applicable Standards:

JIS A 1415-Recommended Practice for Accelerated Artificial Exposure of Plastics Building Materials

JIS B 7502-Micrometer Callipers for External Measurement

JIS B 7507-Vernier Callipers

JIS K 2231-Liquid Paraffin

JIS K 6760-Testing Methods for Polyethylenes

JIS K 6774-Polyethylene Pipes for the Supply of Gaseous Fuels

JIS K 7111-Method of Charpy Impact Test for Rigid Plastics

JIS K 7113-Testing Method for Tensile Properties of Plastics

JIS K 8105-Ethylene Glycol

JIS K 8839-2-Propanol

JIS K 8858-Benzene

JIS K 8891-Methanol

JIS Z 8401-Rules for Rounding off of Numerical Values

Reference Standards:

JIS B 0207-Metric Fine Screw Threads

JIS Z 8203-SI Units and the Use of their Multiples and of Certain other Units

ASTM D 2513-1985 Standard Specification for Thermoplastic gas pressure piping systems

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